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An Empirical Analysis of the Relationships Between Currency Risk and Country Risk, Country Development, and Country Location

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The relationships between currency exchange rate risk and country risk, country development, and country geographic location are examined. Using a sample of 52 countries over the period from 1991 through 1995, results indicate that those countries with relatively high levels of country risk experience relatively high levels of currency risk. This finding supports the argument that those underlying factors that drive country risk seem also to have an influence on currency exchange rate risk. Results of this analysis also indicate that industrialized countries typically experience higher currency risk, as do countries located in the Western Hemisphere of the world. However, these observed relationships are virtually non-existent in the later sub-period (from 1993 to 1995) when compared to the earlier sub-period of time (from 1991 to 1993). Multinational firms would find this new information on international risk relationships useful when developing currency and country risk-control strategies.

I. INTRODUCTION

With the advent of an increasingly globalized marketplace, the importance of foreign direct investment has grown rapidly in recent years. Currency and country risk are important considerations when firms assess the viability of international investment, but much of the extant literature focuses on currency or country risk separately.

Very little attention has been given to the possible relationship that may exist between these two distinctly different types of risks. This is an important issue for firms considering the establishment of operations abroad and for those with existing international operations, as the results of this study offer implications for risk control strategies of multinational firms. Thus, the primary purpose of this study is to examine empirically whether a relationship exists between currency risk and country risk for a sample of diverse countries over

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different time periods. The secondary purpose of this study is to assess how such a relationship may vary across countries with different degrees of economic development and across countries located in different geographic regions of the world.

II. LITERATURE REVIEW

Review of Literature on Country Risk

One facet of country risk is political risk, and Kobrin [35] provides an in-depth discussion of political risk. Brewer and Rivoli [7] suggest that political instability can reduce a country's ability or willingness to service its debt and that countries with political turmoil may be less willing than countries without political turmoil to embark on austerity programs for fear of weakening an already fragile political regime. Brewer [4,5,6], Yu [53], Edwards and Tabellini [22], and Roubini [47] analyze and discuss the relationship between fiscal policy instability and government instability. Burton and Inoue [8] and Citron and Nickelsburg [11] argue that debt reschedulings often follow political upheavals, and they find that explicit consideration of political instability is an important component of country risk analysis. However, Chase, Kuhle, and Walther [10] show no consistent positive relationship between political risk and a political risk premium. But Sethi and Luther [50] argue that broad measures of political risk based on secondary data will be of limited use since data quality may be inconsistent. In a recent study, Fatehi and Safizadeh [25] examine the effect of sociopolitical instability on the flow of foreign direct investment in developing countries, and their results support the notion that multinational firms in different industries do not perceive the same level of risk when political turmoil emerges.

Melvin and Schlagenhauf [41] apply dynamic factor analysis to estimate a monthly country risk index for Mexico. Their results indicate that the ratios of imports to reserves and debt to exports are important determinants of country risk in Mexico's case. However, Bird [2] argues that many of the economic factors considered are essentially static and emphasize the countries' liquidity positions. Nevertheless, Burton and Inoue [9] find that the most powerful variables that influence country risk are foreign aid per capita, political instability, budgetary deficits, growth in gross domestic product, inflation, gross national product per capita, and foreign direct investment per capita.

Nigh [44] finds that the relationship between political events and direct foreign investment is different for less developed countries than for developed countries. Oral, Kettani, Cosset, and Daouas [45] apply a generalized logit (G-LOGIT) model to link country risk rating and political-economic indicators of 70 countries. They find that this method is superior to other statistical models in terms of estimation and validation errors.

Schmidt [49] argues that host governments are apt to aim policy measures at primary and service-sector operations. However, Encarnation and Vachani [23] suggest that firms have several options available to respond to political pressure in favor of host government control of a foreign operation, including preemptive action such as diversification or joint partnerships. Gonzalez and Villanueva [28] propose that the strategic question that management must face during a crisis is whether to continue operations or consider a complete or gradual withdrawal. Harvey [30] surveys 79 multinational firms to ascertain if and how they would cope with a potential terrorist attack and finds that less than half of the firms surveyed have formal programs to deal with such an attack.

Kim [34] finds that patterns of host government intervention vary with changes in the level of competition and economic strength of the firm. Makhija [39] develops a conceptual model of political risk to relate government intervention to specific government objectives. Phillips-Patrick [46] argues that even though foreign ownership tends to increase political risk, other factors can reduce it. He provides evidence to show that a foreign firm with significant future growth opportunities will likely experience less political risk than other foreign firms without such opportunities.

When comparing country risk ratings from the Institutional Investor [32] publication to the results of formal forecasting models, Somerville and Taffler [52] find that bankers are overly pessimistic about the credit-worthiness of developing countries. They attribute this finding to the propensity toward bias in human judgement, which they indicate is supported by research in psychology. Cosset and de la Rianderie [14] show that political risk news transmits important information about a country's investment climate and causes variations in the exchange rate of its currency. This implies that a short-term relationship exists between political risk and currency risk.

Review of Literature on Currency Risk

Lessard and Lightstone [37] show that real exchange rate changes have both margin effects and volume effects, and they argue that managers need to understand that exchange rates can have a significant impact on profits. Bodnar and Gentry [3] contend that exchange rate fluctuations can significantly affect domestic profits by the changing terms of competition with foreign competitors. Hung [31] estimates the impact of exchange rate changes on firms' profits and finds that changes in exchange rate are transmitted to profits through a price-volume effect and a currency translation effect.

Kwok [36] examines whether managers should hedge cash flows originating in different currencies independently or use an integrative approach, and he indicates that while the independent approach does not lead to the lowest risk, this approach could save time and resources as its effectiveness is close to that of the integrative approach. Eaker and Grant [21] provide empirical evidence on the effectiveness of cross-hedging with currency futures in reducing foreign exchange risk. They find that cross-hedging is substantially less effective and more variable than traditional hedging, but they suggest that if cross-hedging is the only alternative, multiple cross-hedges are more effective. Soenen [51] studies the effectiveness of diversification with regard to reducing the variability of a portfolio of currencies, and the results indicate that the marginal reduction in the variation of a firm's currency portfolio diminishes rapidly and becomes almost insignificant with the inclusion of more than eight currencies. DeMaskey [17] compares the effectiveness of currency futures and currency options as hedging instruments of covered and uncovered currency positions. Results of this study indicate that currency futures provide a more effective covered hedge while currency options are more effective for an uncovered hedge. Collier and Davis [12] survey a sample of large U.K. firms about management of currency transaction risk. The results of their survey indicate that for most firms surveyed, management of currency transaction risk is centralized and supported by formal policies for dealing with risk exposure. In a subsequent and similar study of U.K. and U.S. firms, Collier, Davis, Coates, and Longden [13] find that U.S. firms exhibit policies that are slightly more inclined toward asymmetric risk aversion, even when overall risk profiles are similar.

Dumas and Solnik [20] study the currencies of Germany, Japan, the U.K., and the U.S., and they find evidence to support the existence of foreign

exchange risk premia. Hakkio and Sibert [29] argue that the extant literature suggests that the forward exchange rate is not equal to the expected future spot exchange rate because of the existence of a risk premium.

III. ASSESSING COUNTRY AND CURRENCY RISK

Assessing Country Risk

In an early study using discriminant analysis, Frank and Cline [27] find that debt service ratio, imports to reserves ratio, and amortization to debt ratio are significant indicators of country risk. Dhonte [19] applies principal components analysis in a similar context, and Feder and Just [26] reinvestigate the significance of indicators previously examined using logit analysis. They find three additional indicators to be significant: per capita income, capital inflows to debt service payment ratio, and real export growth rate. Similarly, Cosset and Roy [15] find that per capita income level may be useful as a proxy for assessing country risk.

Cosset, Siskos, and Zopounidis [16] evaluate country risk by applying a method that relies on iterative use of an ordinal regression model that rests on a trial-and-error learning process. Their results suggest that gross national product (GNP) per capita, propensity to invest, current account balance on GNP, and export variability are the most important determinants of country risk. Other related studies include Wilson [55], Davis [18], and Saini and Bates [48]. Results of recent empirical research by Mauro [42] on assessing country risk indicate that all categories of country risk are positively and significantly associated with each other and with per capita income levels.

Madura [40] proposes several methods that can be used to estimate country risk, such as the checklist approach, the Delphi technique, quantitative analyses, inspection visits, and reliance on published country risk ratings. Each of these techniques has its advantages and disadvantages. Abdullah [1] notes that use of the checklist approach to assess country risk is most common among bankers.

Country credit risk ratings are published by Euromoney [24] and Institutional Investor [32]. The Euromoney [24] credit ratings are a weighted average of three indicators: market, credit, and analytical indicators. [For a more detailed description, see Euromoney [24], September 1987, page 357.] Institutional Investor [32] ratings are a weighted average, based on an unpublished formula, of ratings compiled from surveys of 75 to 100

international bankers. [For a more detailed description, see Institutional Investor [32], September 1987, page 351.] These ratings are reported twice per year and range from 0 to 100, where higher ratings indicate higher degrees of credit-worthiness or lower risk.

Assessing Currency Risk

Greater degrees of variability in currency exchange rates translate into higher degrees of currency exchange rate risk. Levi [38] supports this argument by stating that "foreign exchange risk is measured by the variance of the domestic-currency value of an asset, liability, or operating income that is attributable to unanticipated changes in exchange rates" [p. 302].

The level of currency exchange rate risk may vary materially across countries. Madura [40] finds that the standard deviation of the Canadian dollar's exchange rate is about one-third that of the British pound, and Levi [38] finds that the volatility of the Japanese yen is three times that of the British pound. Interestingly, Levi [38] finds that the volatility of currency exchange rates for the Canadian dollar, the British pound, the German mark, and the Japanese yen have been generally increasing over time.

IV. HYPOTHESES

Those factors that typically drive country risk, such as economic conditions and political stability, may also have an influence on the level of currency exchange rate risk. To the extent that this is true, one might expect countries with relatively high levels of country risk to experience relatively high levels of currency risk. Thus, the first hypothesis is that countries that exhibit higher levels of country risk should also exhibit higher levels of currency risk.

To the extent that industrialized countries have more stable economies, one might expect those countries to display lower levels of currency exchange rate variability and consequently lower levels of currency exchange rate risk. However, a counter-argument might suggest that the economies of developing countries may be more closely tied to those of their major trading partners, such as the U.S., and therefore those economies may experience relatively low currency exchange rate volatility. This implies that if the U.S. dollar is used as the reference, the currencies of other industrialized countries may exhibit greater volatility with respect to the U.S. dollar than those currencies of

developing countries. Thus, the second hypothesis is that the currencies of industrialized countries should display a higher relative level of currency exchange rate risk than those of developing countries.

Countries in different regions of the world may experience systematically different levels of currency exchange rate risk. This difference may exist because those countries that are located in the Western Hemisphere may be subject to a different pattern of macroeconomic forces than those countries located in the Eastern Hemisphere. Such a difference may be due to the apparent predominance of "controlled" economies in the Eastern Hemisphere of the world. Therefore, to the extent that this predominance exists, one might expect the currencies of countries located in the Western Hemisphere to be more subject to the dynamic forces of trade and investment, which may tend to induce higher relative levels of exchange rate volatility. Thus, the third hypothesis is that the currencies of countries located in the Western Hemisphere should exhibit higher levels of currency exchange rate risk.

V. DATA AND METHODOLOGY

Since all categories of country risk have been observed to be positively and significantly associated with each other [42], country risk ratings published by Euromoney [24] and Institutional Investor [32] would seem to be adequate proxies for country risk. Thus, annual country risk ratings are extracted from various issues of Euromoney [24] and Institutional Investor [32] publications over the five-year period from 1991 to 1995. Over the same period of time, monthly currency exchange rates are extracted from the Wall Street Journal [54] newspaper for 52 different currencies for which data are consistently available over the study period.

Since country risk ratings published by Euromoney [24] and Institutional Investor [32] may capture different facets of country risk, these risk ratings are combined and averaged to form a single risk proxy for each country included in the study. Averaging these ratings seems appropriate as each country is rated on the same scale, from 0 to 100, where lower values represent higher levels of country risk. Thus, for each country included in the study, a proxy for country risk is computed as the grand mean of the country risk ratings extracted from various issues of Euromoney [24] and Institutional Investor [32] over the specified period of time.

In concurrence with the definition of currency risk posed by Levi [38], proxies for currency risk are computed as the standard deviation of the percentage changes in the beginning-of-the-month currency exchange rate for each of the 52 countries included in the study. This amounts to a total of 3120 data points. Exchange rates are measured in U.S. dollars per unit of foreign currency, and standard deviations are computed using monthly data over the five-year study period. An earlier and a later half-period, of two and one-half years each, are also examined.

Country development is indicated by a binary variable coded "one" for industrialized countries and coded "zero" for developing countries, as defined and classified by the International Monetary Fund (IMF) [33]. This definition splits the sample of countries into about half industrialized and about half developing.

Country geographic region is indicated by a binary variable coded "one" for countries located in the western hemisphere and coded "zero" for countries located in the eastern hemisphere. The western hemisphere is defined as anywhere west of 20 degrees east-longitude, which includes countries located in western Europe, north America, and south America. This definition splits the sample into about half of the countries being classified as western and the remainder being classified as eastern.

A complete list of all countries included in the sample appears in Table 1. Table 1 also indicates how sample countries are classified by country development and geographic region of the world.

Ordinary least squares (OLS) regression analysis is used to evaluate the relationship between currency risk and country risk, the degree of country development, and the regional location of the country. The regression model is defined as:

$$CURRISK_{j,t} = a_t + b_{1,t}CTRYRISK_{j,t} + b_{2,t}DEVELOP_j + b_{3,t}REGION_j + \varepsilon_{j,t} \quad (1)$$

where: $CURRISK_{j,t}$ = currency risk proxy defined as the standard deviation of the monthly currency exchange rate in U.S. dollars per unit of foreign currency j over the time period t;

$CTRYRISK_{j,t}$ = country risk proxy defined as the grand mean of the country risk ratings extracted for country j from *Euromoney* and *Institutional Investor* over the time period t;

$DEVELOP_j$ = country development binary variable coded "one" for industrialized countries and coded "zero" for developing countries as defined and classified by the International Monetary Fund (IMF);

$REGION_j$ = geographic region binary variable coded "one" for countries located in the western hemisphere and coded "zero" for countries located in the eastern hemisphere;

a_t = intercept;

$b_{1\text{-}3,t}$ = slope coefficients; and

$\varepsilon_{j,t}$ = error term.

VI. RESULTS

The results of this analysis for the whole five-year period (from 1991 through 1995) and for the earlier and later half-periods, of two and one-half years each, are reported in Table 2. Table 3 provides descriptive statistics for the variables included in the analysis. Multicollinarity does not seem to be a major problem as the variance inflation factors (VIF) are all relatively low values, as shown in Table 2.

For the whole five-year period (Panel A), a strong significant relationship at the 1 percent level is evident between currency risk (CURRISK) and country risk (CTRYRISK), as hypothesized. The slope coefficient is negative, which supports the argument that higher currency risk is associated with higher country risk (as represented by lower country risk ratings). In support of the second hypothesis, a positive significant relationship, at the 5 percent level, exists between the level of country development (DEVELOP) and currency risk. That is, industrialized countries tend to experience higher levels of currency risk than developing countries. As discussed earlier, this phenomenon may be due to close economic relationships between the U.S. and many developing countries. Also, many developing countries peg their currencies to the U.S. dollar, which would tend to promote a positive relationship between country development and currency risk. The slope coefficient of the geographic region variable (REGION) is also significant at the 5 percent level, which supports the hypothesis that countries located in the western hemisphere of the world experience higher levels of currency exchange rate risk. This finding supports the argument that these countries may typically be more subject to the powerful dynamic forces of trade and investment and therefore that they experience higher levels of currency volatility and risk.

Table 1

Sample countries displayed by country development and geographic region

Country Development			
Industrialized		Developing	
Western Hemisphere	Eastern Hemisphere	Western Hemisphere	Eastern Hemisphere
Austria	Australia	Argentina	Bahrain
Belgium	Finland	Brazil	China
Britain	Greece	Chile	Hong Kong
Canada	Japan	Colombia	Hungary
Denmark	New	Ecuador	India
France	Zealand	Malta	Indonesia
Germany		Mexico	Israel
Ireland		Peru	Jordan
Italy		South Africa	Kuwait
Netherlands		Uruguay	Lebanon
Norway		Venezuela	Malaysia
Portugal			Pakistan
Spain			Philippines
Sweden			Poland
Switzerland			Saudi Arabia
			Singapore
			South Korea
			Taiwan
			Thailand
			Turkey
			United Arab Emirates

Note: Country development classifications follow those of the International Monetary Fund (IMF), and western hemisphere is defined as anywhere west of 20 degrees east-longitude, which includes countries located in Western Europe, North America, and South America.

Table 2
Relationships between currency risk and country risk, country development, and geographic region from 1991 to 1995

$$CURRISK_{j,t} = a_t + b_{1,t}CTRYRISK_{j,t} + b_{2,t}DEVELOP_j + b_{3,t}REGION_j + \varepsilon_{j,t}$$

Panel A: (Whole Period, from 1991 to 1995) n=52, Adj. R^2=0.2959, F=8.14***			
Variable	Coefficient	t-statistic	VIF
Constant	0.0564600	5.68***	
CTRYRISK	-0.0006199	-3.59***	2.3
DEVELOP	0.0184700	2.33**	2.7
REGION	0.0136700	2.62**	1.2
Panel B: (Earlier Half-Period, from 1991 to 1993) n=52, Adj. R^2=0.3813, F=11.48***			
Variable	Coefficient	t-statistic	VIF
Constant	0.0605700	6.46***	
CTRYRISK	-0.0007594	-4.53***	2.4
DEVELOP	0.0320700	3.99***	2.7
REGION	0.0113500	2.18**	1.2
Panel C: (Later Half-Period, from 1993 to 1995) n=52, Adj. R^2=0.0614, F=2.11			
Variable	Coefficient	t-statistic	VIF
Constant	0.0415800	2.80***	
CTRYRISK	-0.0003751	-1.53	2.2
DEVELOP	0.0087100	0.82	2.5
REGION	0.0117100	1.63	1.2

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.

$CURRISK_{j,t}$ = currency risk proxy defined as the standard deviation of the monthly currency exchange rate in U.S. dollars per unit of foreign currency j over the time period t,
$CTRYRISK_{j,t}$ = country risk proxy defined as the combined grand mean of the country risk ratings extracted for country j from *Euromoney* and *Institutional Investor* over the period t,
$DEVELOP_j$ = country development binary variable coded one for industrialized countries and coded zero for developing countries as defined and classified by the IMF,
$REGION_j$ = geographic region binary variable coded one for countries located in the western hemisphere and coded zero for countries located in the western hemisphere.
Note: All variance inflation factors (VIF) are relatively low, which implies that multicollinarity is not a major problem [see Neter, Wasserman, and Kutner [43] p.408-411].

Table 3
Descriptive statistics of variables analyzed

Variable (Time Period) n=52	Mean	Std. Dev.	Minimum	Maximum
CURRISK (1991 to 1995)	0.0304	0.0203	0.00009642	0.1160
CURRISK (1991 to 1993)	0.0306	0.0216	0.00009813	0.1101
CURRISK (1993 to 1995)	0.0258	0.0241	0.00009642	0.1432
CTRYRISK (1991 to 1995)	64.590	21.121	19.505	94.694
CTRYRISK (1991 to 1993)	63.200	22.053	17.282	94.629
CTRYRISK (1993 to 1995)	66.591	19.777	25.988	95.030
DEVELOP	0.3846	0.4913	0.000	1.000
REGION	0.5000	0.5049	0.000	1.000

CURRISK = currency risk proxy defined as the standard deviation of the monthly currency exchange rate in U.S. dollars per unit of foreign currency,
CTRYRISK = country risk proxy defined as the combined grand mean of the country risk ratings extracted from *Euromoney* and *Institutional Investor*,
DEVELOP = country development binary variable coded one for industrialized countries and coded zero for developing countries as defined and classified by the IMF, and
REGION = geographic region binary variable coded one for countries located in the western hemisphere and coded zero for countries located in the western hemisphere.

When the five-year period of study is split into earlier (Panel B) and later (Panel C) half-periods, the results change dramatically. The results from the analysis that covers the earlier half-period are stronger, as indicated by an increase in the adjusted R^2 from about 30 percent for the whole five-year period to about 38 percent for the earlier half-period. The signs of the respective coefficients remain unchanged. Conversely, the results from the analysis that spans the later half-period are substantially weaker, as indicated by a decrease in the adjusted R2 from about 30 percent for the whole five-year period to about 6 percent for the later half-period. With respect to the later half-period, none of the slope coefficients are statistically significant at any conventional level.

These findings appear to indicate that the relationships between currency risk and country risk and country development are changing over time. These

results imply that these relationships are de-coupling, which means that the typical historical positive association between currency risk and country risk may be disintegrating with the passage of time. Moreover, the relationship between currency risk and country development also seems to be crumbling, as is the relationship between currency risk and geographic region. Perhaps these observed changes are a manifestation of the effects of increasing globalization. Thus, these findings hold rich implications for the risk control strategies adopted by multinational companies and other constituents of the global marketplace.

VII. SUMMARY AND CONCLUSION

This study examines the relationships between currency exchange rate risk and country risk, country development, and country geographic location. Using publicly available data for a sample of 52 countries over the period from 1991 through 1995, results of the analysis indicate that those countries with relatively high levels of country risk experience relatively high levels of currency risk. This finding supports the argument that those underlying factors that drive country risk seem also to have an influence on currency exchange rate risk. The results also indicate that industrialized countries typically experience higher currency risk, as do countries located in the Western Hemisphere of the world. However, these observed relationships seem to be substantially weaker and virtually non-existent in the later sub-period (from 1993 to 1995) when compared to the earlier sub-period of time (from 1991 to 1993).

Several major conclusions emerge from the results of this study that would be useful to multinational firms and other constituents of the global marketplace. First, historical relationships between currency exchange rate risk and country risk may no longer hold. This implies that traditional hedging strategies may need to be modified to reflect changing risk relationships. Second, the aggregate difference in currency exchange rate risk level that seems to have existed historically between industrialized countries and developing countries may be disintegrating. And third, the typical differences in regional patterns of currency exchange rate risk may also be diminishing. In conclusion, multinational firms would likely find this new information on international risk relationships useful when developing currency and country risk control strategies.

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